

CLAIMS

1. A broadband circuit with which a circuit device is connected through a transmission line including a signal transmission conductor, a grounding conductor, and a dielectric present between these conductors, characterized in that a line device having a four-terminal line structure in which a pair of conductors are faced each other, having an impedance lower than that of a conductor to be connected to any terminal, setting $\tan\delta$ to 0.05 or more as the transmission loss of the dielectric, and using the frequency band of an electromagnetic wave having a wavelength shorter than the length approximately four times larger than the length of the line as an object frequency band is inserted into the transmission line and used as a low impedance device to the electromagnetic wave of the object frequency band.

2. The broadband circuit according to claim 1, in which a signal source for outputting signal electromagnetic waves and a passive device to be operated in accordance with an input signal are connected by the transmission line into which the line device is inserted, characterized in that the line device inserted into the transmission line includes at least some of spectrums of signal electromagnetic waves in an object frequency band, one end of either of a pair of conductors of the line device is connected to the output terminal of the signal source and the other end of it is connected to the input terminal of the passive device, and the other ends of the conductors are connected to the ground.

3. The broadband circuit according to claim 2, characterized in that the signal source and the line device are connected through a device mainly including a reactance component in the object frequency

band.

4. The broadband circuit according to claim 2, characterized in that the signal source and the line device are connected through a resistance.

5. The broadband circuit according to any one of claims 2 to 4, characterized in that

frequency components in the object frequency band of the line device among signal electromagnetic waves propagated from the signal source up to the line device are reflected by the line device,

frequency components out of the object frequency band of the line device propagate to the passive device side through the line device, and

a DC component transmits to the passive device side through one of a pair of conductors of the line device connected to the signal source and the passive device.

6. The broadband circuit according to claim 1 in which a signal source for outputting a signal electromagnetic wave and a passive device to be operated in accordance with an input signal are mutually connected by the transmission line into which the line device is inserted, characterized in that

the line device inserted into the transmission line includes at least some of the spectrums of the signal electromagnetic waves in the object frequency band,

one end of one of a pair of conductors of the line device is connected to the output terminal of the signal source and the other end of it is electrically opened, the end of the other conductor at the passive device side is connected to the input terminal of the passive device, and at least one end is connected to the ground through a device mainly

including a reactance component in the object frequency band.

7. The broadband circuit according to claim 1 in which a signal source for outputting a signal electromagnetic wave and a passive device to be operated in accordance with an input signal are mutually connected by the transmission line into which the line device is inserted, characterized in that

the line device inserted into the transmission line includes at least some of the spectrums of the signal electromagnetic wave in the object frequency band,

one end of one of a pair of conductors of the line device is connected to the output terminal of the signal source and the other end of it is opened, the end of the other conductor at the passive device side is connected to the input terminal of the passive device, and at least one end is connected to the ground through a resistance.

8. The broadband circuit according to claim 6 or 7, characterized in that

frequency components in the object frequency band of the line device among signal electromagnetic waves propagated from the signal source up to the line device are propagated to the passive device side through a line including one of a pair of conductors of the line device connected to the input terminal of the passive device and the ground, and

frequency components out of the object frequency band enter the line device and attenuate.

9. The broadband circuit according to claim 1 in which a signal source for outputting a signal electromagnetic wave and a passive device to be operated in accordance with an input signal are mutually

connected by the transmission line into which first and second line devices are inserted, characterized in that

the first and second line devices respectively include at least some of the spectrums of the signal electromagnetic waves in their object frequency bands,

one end of one of a pair of conductors of the first line device is connected to the output terminal of the signal source and the other end of it is electrically opened, the end of the other conductor at the opposite side to the signal source is connected to one of a pair of conductors of the second line device, and at least one end is connected to the ground through a device mainly including a reactance component or a resistance in the object frequency band of the first line device, and

the other end of one of a pair of conductors of the second line device whose one end is connected with the first line device is connected to the input terminal of the passive device and both ends of the other conductor are connected to the ground.

10. The broadband circuit according to claim 7, characterized in that the first line device and the second line device are mutually connected through a device mainly including a reactance component or a resistance in the object frequency band of the second line device.

11. The broadband circuit according to claim 9 or 10, characterized in that

frequency components in the object frequency band of the first line device among signal electromagnetic waves propagated from the signal source up to the first line device are propagated to the second line device side through a line including one of a pair of conductors of the first line device connected with a conductor of the second line device and the ground,

frequency components out of the object frequency band of the first line device enters the line device and attenuate,

frequency components in the object frequency band of the second line device among signal electromagnetic waves propagated up to the second line device are reflected by the second line device, and

frequency components out of the object frequency band of the second line device are propagated to the passive device side through the second line device.

12. The broadband circuit according to claim 1 in which a signal source for outputting a signal electromagnetic wave and a passive device to be operated in accordance with an input signal are mutually connected by the transmission line into which the first and second line devices are inserted, characterized in that

the first and second line devices respectively include at least some of the spectrums of the signal electromagnetic waves in their object frequency bands,

one end of one of a pair of conductors of the first line device is connected to the output terminal of the signal source and the other end of it is connected to the one of a pair of conductors of the second line device and both ends of the other conductor are connected to the ground,

the other end of one of a pair of conductors of the second line device whose one end is connected with the first line device is electrically opened, the end of the other conductor at the passive device side is connected to the input terminal of the passive device, and at least one end is connected to the ground through a device mainly including a reactance component or a resistance in the object frequency band of the second line device.

13. The broadband circuit according to claim 12, characterized in that

frequency components in the object frequency band of the first line device among signal electromagnetic waves propagated from the signal source up to the first line device are reflected by the first line device,

frequency components out of the object frequency band of the first line device are propagated to the second line device side through the first line device,

frequency components in the object frequency band of the second line device among signal electromagnetic waves propagated up to the second line device are propagated to the passive device side through a line including one of a pair of conductors of the second line device connected to the input terminal of the passive device and the ground, and

frequency components out of the object frequency band of the second line device enter the second line device and attenuate.

14. The broad circuit according to claim 1 in which a signal source for outputting a signal electromagnetic wave and a passive device to be operated in accordance with an input signal are mutually connected by the transmission line into which the first and second line devices are inserted, characterized in that

the first and second line devices respectively include at least some of the spectrums of the signal electromagnetic waves in their object frequency bands,

one end of one of a pair of conductors of the first line device is connected to the output terminal of the signal source, the other end of it is connected to the input terminal of the passive device, and both end of the other conductor are connected to the ground,

one end of one of a pair of conductors of the second line device is connected to the output terminal of the signal source and the other end of it is electrically opened, the end of the other conductor at the passive device side is connected to the input terminal of the passive device, and at least one end is connected to the ground through a line mainly including a reactance component or a resistance in the object frequency band of the second line device.

15. The broadband circuit according to claim 14, characterized in that

frequency components in the object frequency band of the first line device among signal electromagnetic waves propagated from the signal source up to the first line device are propagated to the passive device side through a line including one of a pair of conductors of the first line device connected to the input terminal of the passive device and the ground,

frequency components out of the object frequency band of the first line device enter the first line device and attenuate,

frequency components in the object frequency band of the second line device among signal electromagnetic waves propagated from the signal source up to the second line device are reflected by the second line device, and

frequency components out of the object frequency band of the second line device transmit to the passive device side through the second line device.

16. The broadband circuit according to any one of claims 12 to 15, characterized in that the signal source and the first line device are mutually connected through a device mainly including a reactance component or a resistance in the object frequency band of the first line

device.

17. The broadband circuit according to claim 1 in which a signal source for outputting a signal electromagnetic wave and a passive device to be operated in accordance with an input signal are mutually connected by the transmission line into which the line device is inserted, characterized in that

the line device inserted into the transmission line includes the spectrum of the signal electromagnetic wave in the object frequency band,

one end of one of a pair of conductors of the line device is connected to the output terminal of the signal source and the other end of it is connected to the input terminal of the passive device, and at least one end of the other conductor is connected to the ground through a terminal resistance.

18. The broadband circuit according to claim 17, characterized in that

frequency components in the object frequency band of the line device among signal electromagnetic waves propagated from the signal source up to the line device are propagated to the passive device side through a line including one of a pair of conductors of the line device connected to the signal source and the passive device and the ground, and

a DC component transmits to the passive device side through one of a pair of conductors of the line device connected to the signal source and the passive device.

19. The broadband circuit according to claim 1 in which a signal source for outputting signal electromagnetic waves and a passive

device to be operated in accordance with an input signal are mutually connected by the transmission line into which the first line device is inserted and a power supply for supplying power to the signal source and the first line device are mutually connected through the second line device, characterized in that

the first and second line devices include spectrums of the signal electromagnetic waves in their object frequency bands,

one end of one of a pair of conductors of the first line device is connected to the output terminal of the signal source and the other end of it is connected to the input terminal of the passive device, and at least one end of the other conductor is connected to the second line device through a terminal resistance, and

one end of one of a pair of conductors of the second line device is connected to the first line device through the terminal resistance and the other end of it is connected to the power supply, and both ends of the other conductor are connected to the ground.

20. The broadband circuit according to claim 19, characterized in that

frequency components in the object frequency band of the first line device are propagated to the passive device side through a line including one of a pair of conductors of the first line device connected to the signal source and passive device and the ground,

frequency components out of the object frequency band of the first line device are propagated to the passive device side through the first line device, and

a DC component transmits to the passive device side through one of a pair of conductors of the first line device connected to the signal source and the passive device.

21. The broadband circuit according to any one of claims 17 to 20, characterized in that the terminal resistance has a resistance value equal to that of a signal transmission conductor connected to the end of the side at which the terminal resistance of the line device to which the terminal resistance is not connected is connected.

22. The broadband circuit according to any one of claims 17 to 21, characterized in that

the line device is further set on a power supply line for connecting the signal source with a power supply for supplying power to the signal source, and

one end of one of a pair of conductors of the line device set to the power supply line is connected to the power terminal of the signal source and the other end of it is connected to the power supply and both ends of the other conductor are connected to the ground.

23. The broadband circuit according to any one of claims 2 to 22, characterized in that

the signal source and the passive device are mounted on a printed circuit board on which the signal transmission conductor is formed as a wiring pattern and the grounding conductor is formed as a ground plane and a wiring pattern connected to the ground plane, and

in the case of the line device mounted on the printed circuit board, at least one ends of the conductors are connected to the wiring patterns of the signal transmission conductor and the grounding conductor and inserted into the line device.